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High rate of antimicrobial resistance in bloodstream infections among infants and children in India

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Background: Surveillance of local microbiological profile and antimicrobial resistance pattern is essential to guide empiric antimicrobial therapy and establish strategies to deal with changing antimicrobial resistance. We aimed to study the profile of pediatric bloodstream infections, antimicrobial resistance and clinical outcomes in a tertiary care hospital in India.

Methods & Materials: Ambulatory and hospitalized children who had at least one blood culture between November 2012-April 2015 were included in this analysis. BACTEC BD9120 automated system was used for culture and antimicrobial sensitivities were assessed by the Kirby-Bauer method. Resistance was determined as per the CLSI 2014 guidelines. Multi-drug resistance was defined as non-susceptibility to at least one agent in three or more antimicrobial categories. Positive cultures obtained from ambulatory patients or within 72 hours of hospital admission were classified as community-acquired infections; those positive beyond 72 hours of hospitalization were healthcare-acquired infections.

Results: Among the 27,491 neonates and children evaluated during the study period, 12,264 blood cultures were obtained, with 882 positive cultures yielding 895 pathogens (culture positivity rate 7.3%). Isolates identified as commensals as per CDC guidelines (n=372) were excluded from the analysis. 55.8%(n=292) of the infections were community acquired. Hospital acquired infections were more prevalent among infants (<1yr) (n=109, 54.5%). Gram-negative organisms predominated (72.6vs 25.0% of gram positive organisms and 2.4% fungi). Overall, 79.3% (n=415) of the isolates were resistant to at least one antibiotic while 45.3%(n=237) were multi-drug resistant. Extended spectrum beta-lactamase production was seen in 22.0%(n=110) of the isolates. Among the 47 isolates of Staphylococcus aureus, 20 (42.5%) were methicillin resistant. Hospital acquired infections were more frequently associated with multi-drug resistance than community acquired (64.0% vs 30.4%, p<0.001). The overall mortality rate was 10.8%. Children with multi-drug resistance had longer duration of hospitalization (17vs 5 days, p=0.007) and were at greater risk of death (OR-3.04, p<0.001) than those without antimicrobial resistance.

Conclusion: High rates of antimicrobial resistance were seen in our study. The higher prevalence of drug resistance in hospital-acquired infections highlights the need for robust infection control practices. The study also reveals significantly longer hospital stay and higher risk of mortality in children with multi-drug resistance.

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Investigating the distribution of integrons among clinical isolates of acinetobacter baumannii and their association to carbapenem resistance

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Background: **Background**: To determine the dissemination of classes of integrons and their roles in carbapenem resistant strains of *Acinetobacter baumannii*. Integron1, 2 and 3 have been reported in various microrognisms and are implicated in conferment of multi drug resistance. Carriage of carbapenem resistance genes on these integrons has not been consistent. Multidrug drug resistance is being increasingly reported in *A.baumannii*. Though integron 1 and 2 have been detected, there is no report from India correlating carbapenem resistance to the presence of integrons in *A.baumannii*.

Methods & Materials: **Materials and methods**: One hundred fifteen (n=115) clinical isolates of *A.baumannii* were collected from different clinical specimens of clinical microbiology laboratories two different tertiary care hospitals. Cultures were identified by routine microbiology methods and also by VITEK-2 system. Antimicrobial susceptibility testing and minimum inhibitory concentration for panel of 20 antibiotics were examined. To investigate classes of integrons, multiplex PCR for integrase *intI*1 and *intI*2 was performed along with *A.baumannii* species specific marker (Ab-ITS). ClassA, B and D carbapenemases were identified in these isolates and the distribution of carbapenemases with specific reference to type of integron has been determined by PCR.

Results: **Results**: A total of 115 isolates were included in this study. Genotypic and phenotypic results showed 93(80%) as carbapenem resistant and 22(20%) as carbapenem sensitive isolates. Out of the 93 carbapenem resistant isolates, 76 (81%) isolates possessed integrons. 58(62%) isolates carried class 1 integron and 18(19%) isolates carried class 2 integron. Surprisingly, 11 carbapenem resistant isolates and two carbapenem sensitive isolates harboured both classes of integrons. One carbapenem sensitive isolate had only class 2 integron.

Conclusion: **Conclusion**: Multiplex PCR for the detection and identification of integron classes along with species specific marker (Ab-ITS) will be a useful method for the epidemiological studies. This rapid, reliable determination of the genetic relatedness of clinical isolates in this antibiotic era is essential when investigating cases of nosocomial outbreak.

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